Advanced Vitrification System (AVS)
Technology Development Project

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Abstract

The Radioactive Isolation Consortium, LLC (RIC) is executing a contract with the Department of Energy (DOE) to develop and demonstrate its unique and innovative concept for vitrifying high-level radioactive waste. This new concept provides a patented approach to vitrification-in-the-final-storage-canister that holds the potential for significantly greater safety, reliability, and economy than current high-level radioactive waste vitrification systems.

RIC is scheduled to complete the demonstration of a half scale operating prototype at the end of Stage 2 of the contract in about 18 months. Stage 2 will begin after DOE completes its Gate 3 review of Stage 1, that is, the Exploratory Development Stage. Completion of the review is expected at the end of October, 1999.

The Exploratory Development Stage produced high quality samples of glass using a range of Hanford-based simulant compositions and concentrations. The bench-scale samples have demonstrated the viability of the RIC concept by making glass with excellent leach resistance characteristics using waste concentrations up to 100% by weight.

In the product glass, waste concentrations are 2 to 3 times greater than the waste concentrations in glass made using conventional melters. This RIC AVS capability can reduce the number of canisters needed to dispose of the Hanford high level waste by a factor of 2 to 3.

Experimental results have also confirmed that the RIC AVS can

- vitrify caustic high level wastes with a pH up to 13.4,
- tolerate wide chemical variations in high level waste feeds, as is present at Hanford,
- vitrify high level wastes with simpler waste and feed pretreatment requirements, and
- greatly shorten the time required to vitrify all of Hanford's high level wastes.

A pre-conceptual design of the full-scale embodiment of the RIC AVS concept has been developed and has been used as the basis for a preliminary life-cycle cost estimate that confirms that the RIC AVS costs per unit of waste vitrified are less than half the costs per unit vitrified of a continuous throughput conventional melter.

RIC intends to offer DOE a competing privatization proposal for treating the Hanford wastes at the end of Stage 2.

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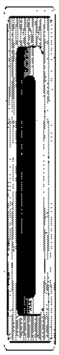

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Burns & Roe Enterprises, Inc.
James Jordan
James R. Powell, Ph.D
Morris Reich, Ph.D.
UCAR Carbon Company, Inc
Louis Venuto, Jr. Esq.

AVS

ADVANCED VITRIFICATION SYSTEM

Technology Development Project

DE-AC26-98FT40450

Industry Partnerships to Deploy Environmental Technology Conference

Presentation to

Conferees

October 12-14 at FETC, Morgantown, WV

James Jordan, President
James Powell, Vice President and Chief Scientist

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  For remediation or decontamination of chemically contaminated or radioactive sites.

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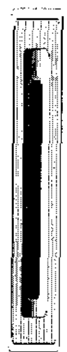

AVS Presentation Outline

- Overview of the AVS Technology-James Powell, Vice President and Chief Scientist, Project Co-Principal Investigator

- Overview of AVS Technology Development Program-James Jordan, President and CEO

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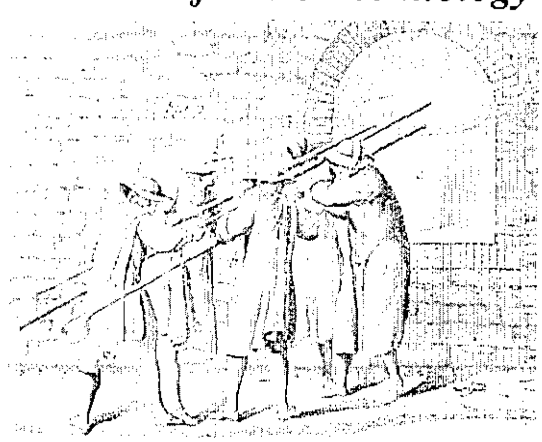
Overview of AVS Technology



Presented by
James Powell
Co-Principal Investigator

AVS *Project Goals*

Prove that the AVS yields major benefits compared to conventional vitrification systems, in terms of:

- **Handles Wide Variations in the Feed Envelope**
- **Fewer Disposal Containers (Higher Waste Loading)**
- **Greater Operational Reliability (No Single Point of Failure)**
- **Lower Life Cycle Costs**
- **Reduced D&D Requirements**
- **Flexibility in Melt Temperature**
- **Quality Glass with Higher Waste Loadings and Tolerance for Greater Variations in Waste Composition**
- **Low Environmental Emissions and Worker Radiation Exposure**
- **Potential for Enhanced Compatability with NRC Criteria for Permanent Disposal (10CFR60)--Two Independent Barriers**

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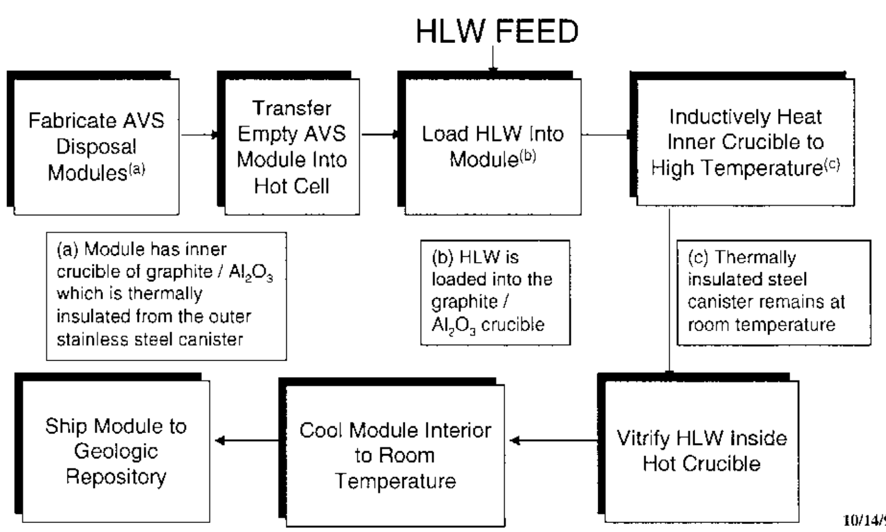
The AVS System: How does it work?



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Why AVS?

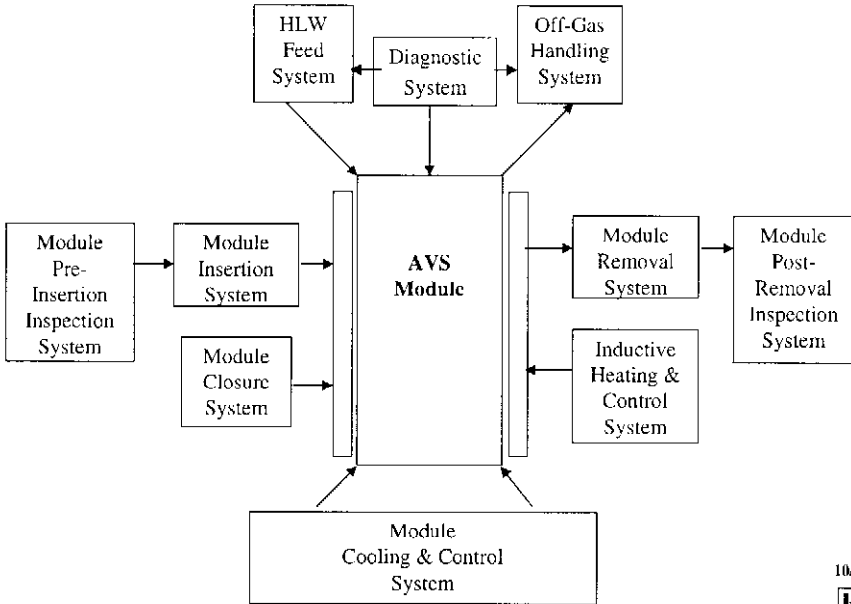
Compared To The Conventional Melter Approach for Vitrifying High Level Nuclear Waste (HLW), The AVS Will be:

- Much Cheaper in Capital and O & M Costs
- Safer and More Reliable
- Much More Adaptable to Varying HLW Feeds
- Able to Load Much More HLW into a Disposal Canister
- Much Less Demanding for Blending and Pretreating the HLW Feed
- Much Quicker in Carrying Out a HLW Disposal campaign

The AVS System: Comparison with Conventional Melters

RIC-AVS		Conventional Melters
100%	HLW Volume Fraction in Glass	25%
1500°C	Max Vitrification Temperature	1200°C
Hours	Time at Temperature	Years
None Identified	Single Point Failure Possible?	Yes
Excellent	Glass Leach Resistance	Good
No	Molten Glass Pour Necessary?	Yes
Yes	Can Handle Wide Range of HLW Feeds?	No
Very Little	HLW Pretreatment / Melter Feed Additives Needed?	Extensive
No	Sensitive to Problem Elements (Cr, Zr, etc.)?	Yes

AVS *Module Facility Sub-Systems*



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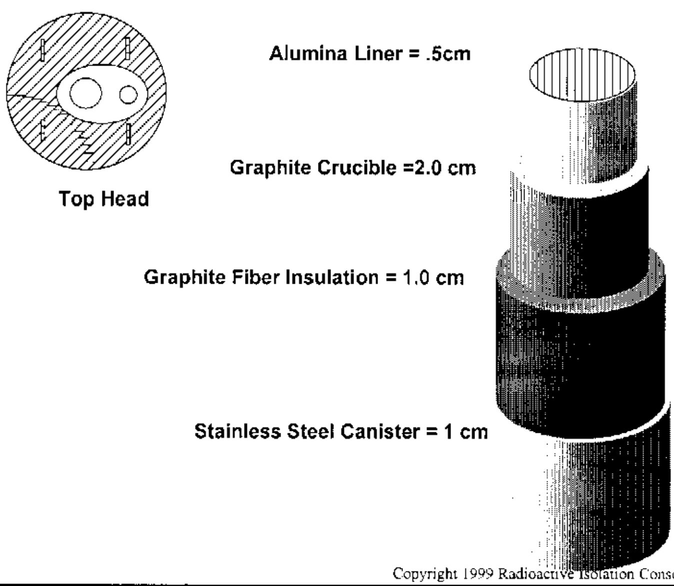
RIC-AVS
Baseline Module Design



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Principal Features of the AVS Module

- Inner High Temperature Graphite Crucible
- Outer Stainless Steel Canister at Near Ambient Temperature
- Thermal Insulation Between Hot Graphite Crucible from Cool Stainless Canister
- Low Frequency (30 Hertz) AC Inductive Coil Heats Graphite Crucible and Stainless Canister (Forced Air Cooled)
- Dewatered HLW Sludge/Frit Mixture is Extruded at Ambient Temperature Into Hot Graphite Crucible
- Residual H_2O in HLW/Frit Mix Evaporates as Module is Filled Over 1 Day
- HLW/Frit Mixture is Vitrified inside the AVS Module in a Four Stage Process
- Total Process Time is ~3 Days per Module
- Stainless Canister is Closed After Canister Cools to Room Temperature
- Cooled Module is Removed for Final Disposal

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RIC AVS

AVS Module Parameters

- 4.5 Meters Length
- 0.62 Meter Outside Diameter
- 1 Centimeter Thick Stainless Steel Canister
- 1.0 Centimeter Thick Graphite Fiber Insulation
- 2.0 Centimeter Thick Graphite Crucible (Plasma Sprayed Al_2O_3 Coating)
- 0.5 Centimeter Thick Alumina Crucible
- 1 m^3 Volume Inside Crucible
- ~3 Day Process Time
- 1,200 Kilograms Empty Weight
- 3,300 Kilograms Filled Weight (70% Fill Efficiency, $\rho_{GLASS} = 3{,}000 kg/m^3$)
- 2/1 Ratio, A/C Heating in stainless/graphite
- ~$1,000 for Electrical Energy to Process Module (assume 10¢/kw-hr)

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RIC AVS

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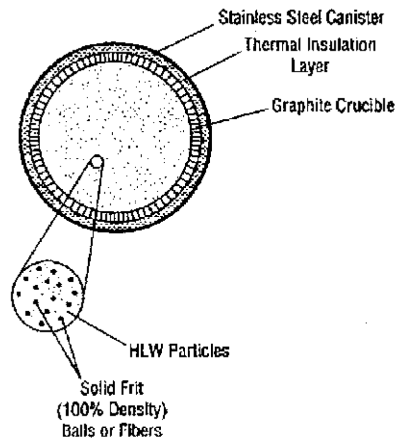
Geometry of Homogeneous/Heterogeneous HLW Aggregate Frit Feed Mixtures in AVS Module

HLH/Aggregate Frit



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RIC AVS

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Why Extruded Dewatered Sludge with Solid Frit Aggregate was Selected for Baseline

- **High Canister Fill Efficiency**
  - **Same as Separate Solid Frit Option**
  - **Greater than Fine Frit Option**
- **Minimizes Melt Hold Time for Mixing of HLW & Frit**
  - **No Need for Mixing on Large Scale, as Compared to separate Solid Frit Options**
- **Enables Quick Changes in HLW/Frit Feed Ratio and Frit Composition to Meet Variations in HLW Properties, as Compared to Modules with Pre-Assemble Solid Frit Sections**
- **Can Handle all HLW Loading Cases**

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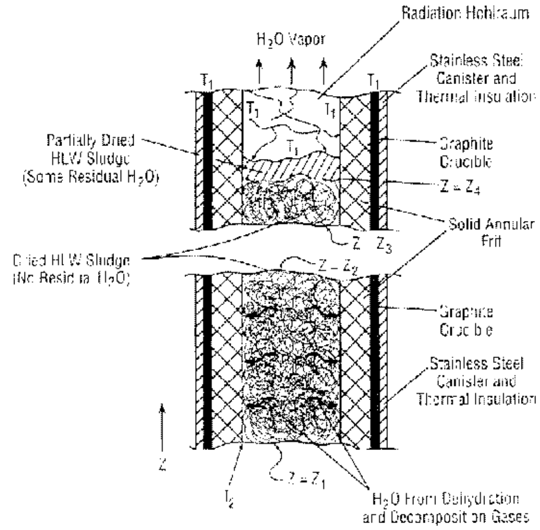
RIC AVS

Concurrent Fill and Dry Option



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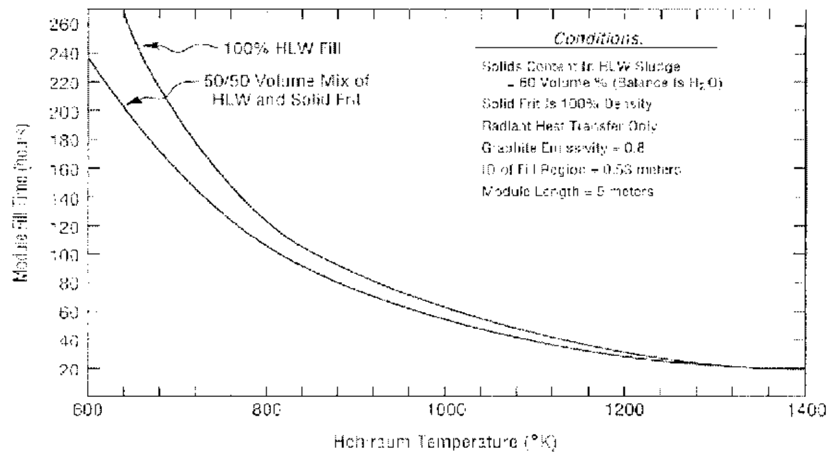
Module Fill Time as a Function of Hohlraum Wall Temperature for Concurrent Fill and Dry Option



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AVS Canister Fill Efficiency

***Basis:** 62 centimeter diameter; 4.5 meters long; HLW=3000Kg/m3; Frit=2500 Kg/m3 90% Fill Height for Conventional and AVS Canister, Rss=1 cm; Rins=1cm; Rgraphite+AL2O3=2.5 cm; HLW loadings are weight %;Conventional canister has 25%*

Parameter	AVS Concurrent Fill&Dry		AVS Concurrent Fill, Dry Melt		Conventional Canister
	70% HLW, 30% FRIT	100% HLW	70% HLW, 30% FRIT	100% HLW	
AVS Vitrified Product Volume, M3	0.68	0.53	0.89	0.89	—
Conventional Glass Volume, M3	—	—	—	—	1.15
AVS HLW Content, Kg.	1224	1602	1770	2670	—
Conventional Canister, HLW Content, Kg.	—	—	—	—	750
R= (HLWAVS)/ (HLW Con)	1.6	2.1	2.36	3.6	—

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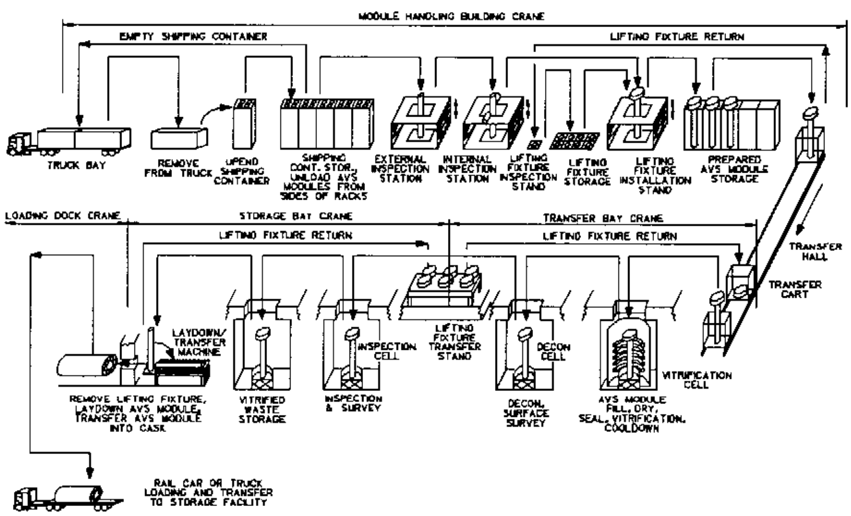
EIC AVS

AVS Process-Module Flow



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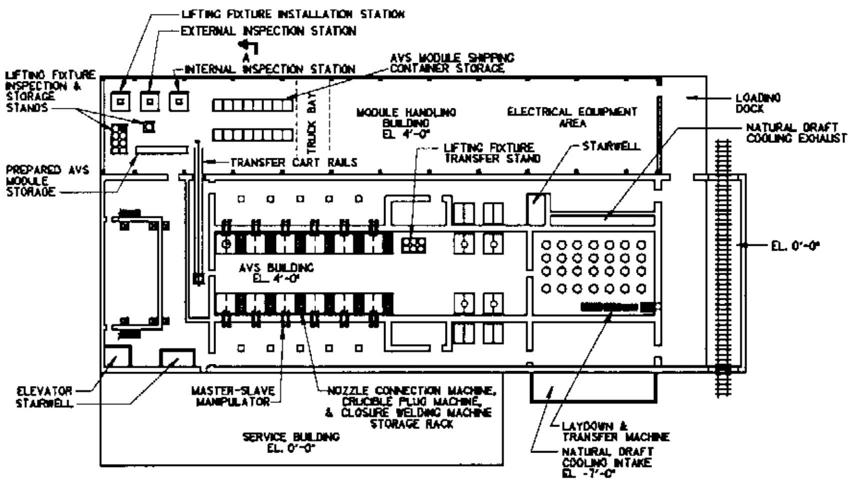
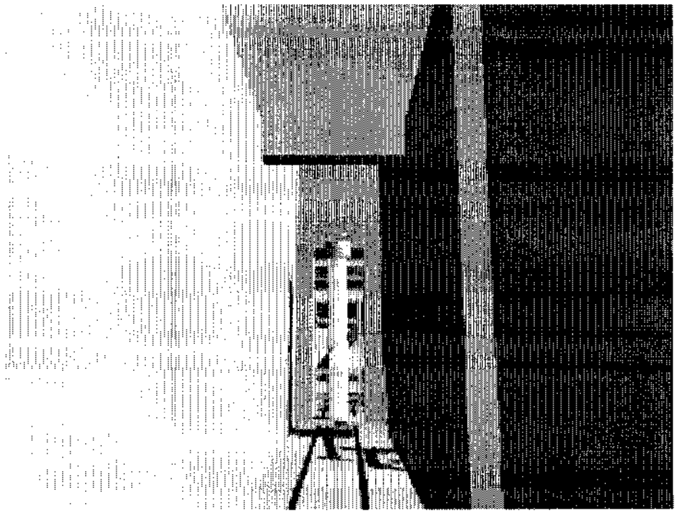
EIC AVS



Preliminary RIC-AVS *Facility Design and Operational Concept*



The AVS System Technology Status

AVS Melter Performance	AVS Glass Performance
• Graphite / Al_2O_3 Crucible Operated at 1500°C • Simple & Easy Control of Melt Temperature • No Foaming Problems	• 100 % HLW Loadings Have Been Produced • Excellent Leach Resistance (1/100th to 1/10th of PCT Requirements) • Wide Range of HLW Compositions Successfully Vitrified • No Pretreatment Needed
AVS Materials	**AVS Operational Unit**
• Materials Commercially Available • Commercial Fabrication Exists	• Half Scale AVS Prototype Proposed In Next Stage of Program • Full Scale Hot Demo Could Operate in 4 to 5 Years

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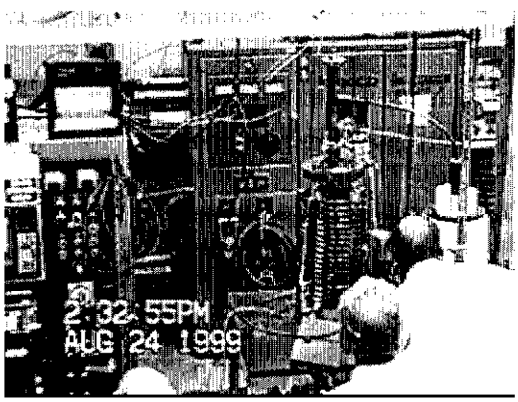
AVS *Bench Scale Tests*



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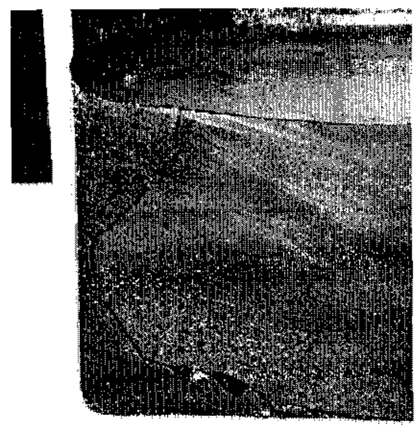
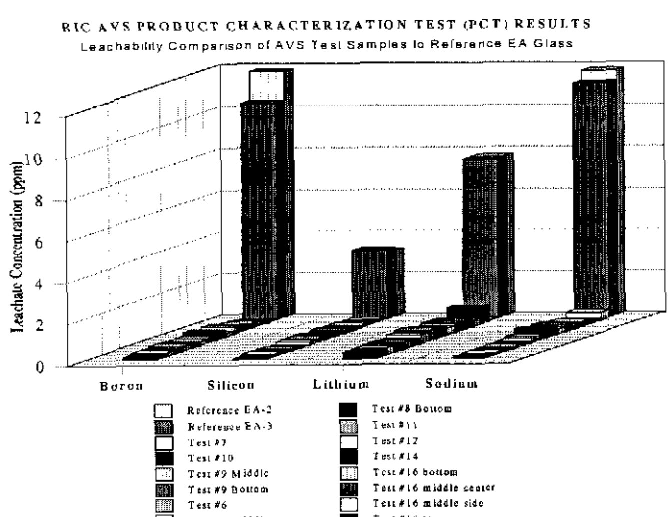
AVS Bench Scale Test Results Test 10

- 70% TFA Waste Simulant
- 30% Frit
- 6 hrs @ 1450ºC
- ASTM Leach Results: Better than standard



Environmental Protection Advantage



Graphite Extrusion Press

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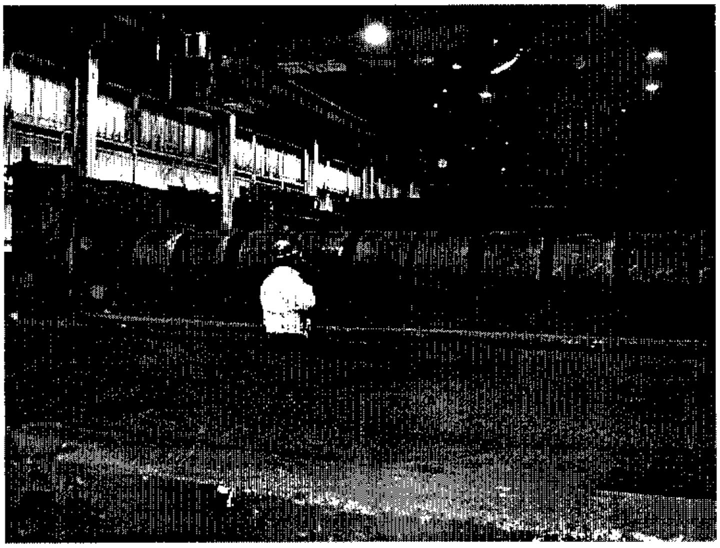
Graphite Bake Furnaces (3000°C)



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Large Machined Graphite Shapes

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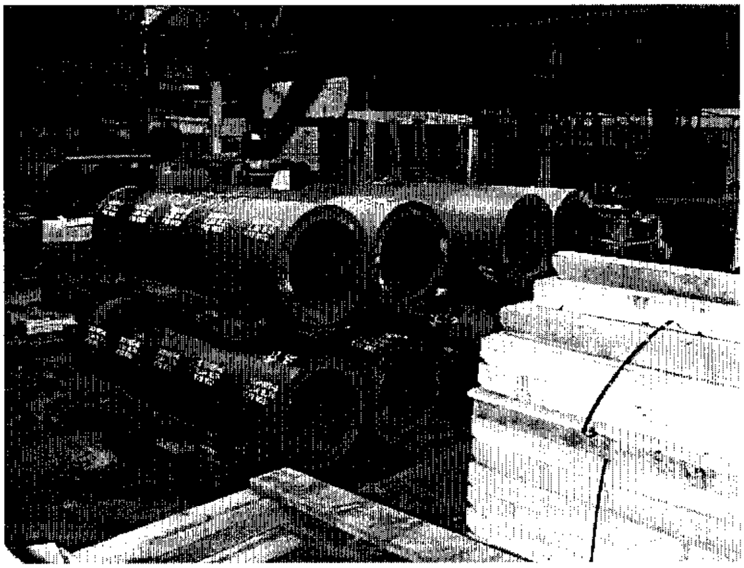

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Thin-Walled Graphite Shapes

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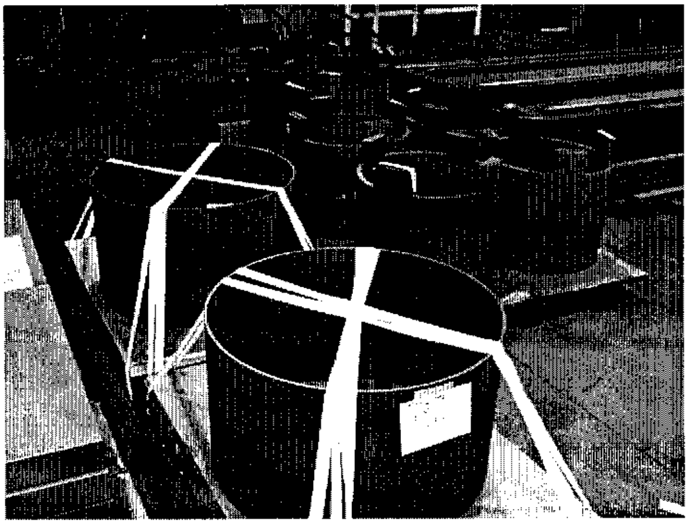

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Summary and Conclusions

- AVS Module Uses Well Known Commercial Materials
  - Stainless Steel Canister
  - Graphite and Alumina Crucibles
  - Graphite Fiber Insulation
- Dewatered HLW/Frit Mixture Extruded Into Inductively Heated Hot Graphite Crucibles Inside Module
- ~3 Days to Process a Module (Heat & Dry HLW/Frit Feed, Melt HLW/Frit Mixture, Cool Product Glass
- Modest Electrical Requirements for AVS Process
  - 30 Hz AC Frequency
  - 150 kW(e) Average Power for Module
  - ~$1000/Module Energy Cost (10¢/kw-hr)
- AVS Product Glass has:
  - High HLW Loading (70% or More Compared to 25% for Conventional Melter)
  - Capability to Handle Wide Range of HLW Composition (High Bi, Cr, Zr, etc.)
- One AVS Module can Dispose of More HLW Than One Canister from a Conventional Melter. (Up to 3 times as Much)

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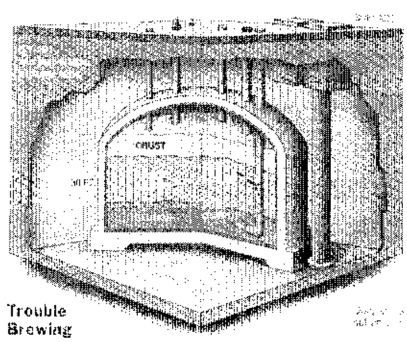
Overview of the AVS R&D Program



James Jordan

President and CEO

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Why Hanford?

- Congress directed, and DOE agreed, to a backup for Hanford privatization
- Provides Price Competition for Privatization Contractor
- Hanford's chemically diverse wastes are uniquely suited to RIC AVS technology
- Hanford is the largest source of HLW in the DOE inventory
- RIC AVS can win the high priority race against aging tank failures.
- RIC AVS payback to the Government is greatest at Hanford.

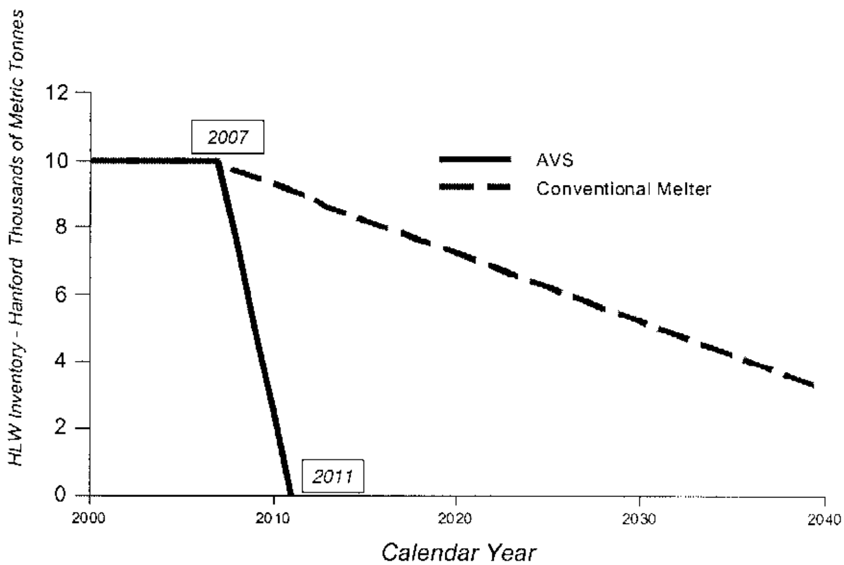
Relevant to High-Priority DOE Environmental Management Need

DOE . . . View[s] the tank waste cleanup as one of their top priorities." *DOE Report to Congress, Treatment and Immobilization of Hanford Radioactive Tank Waste, July 1998.*

United States Congress

National Policy Priority for Development of High-Payback Research, such as "**small, modular inductive in-can vitrification,**" Set by Congress. *FY 1997 Energy and Water Conference Report, 104-782, p. 85. See also, FY 1998 Energy and Water, Rept. 105-271, p. 92; and FY 1999 Energy and Water, Rept. 105-749, p. 106.*

Shorter Hanford Campaign



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AVS *Cost Benefit*

Projected Life Cycle Costs for Hanford Vitrification		
System	$Kg/HLW	$ for 10,000 tons
RIC-AVS	**$460**	**$4.6 B**
Current Privatization Contract at Hanford Site	**$1,200**	**$12.0 B**
DWPF at Savannah River Site	**$2,400**	**$24.0 B**

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Why AVS Vitrification Cost is Low

- **High HLW Loading in AVS Product Glass (80% vs 25%)**
- **Low Annual and Integrated O&M Cost ($1.3 B vs. about $10 B)**
- **Low Capital Cost of AVS Vitrification Facility ($0.24 B vs about $1.6 B)**

Additional Savings from AVS but not Included in Preliminary Cost Estimate

- ***Lower Repository Fees (1/2 the number of canisters)***
- ***Cheaper HLW Pretreatment***
- ***Much Cheaper System D&D ($11 million vs $94 million)***
- ***Reduces Urgency of Need for 2nd Repository***

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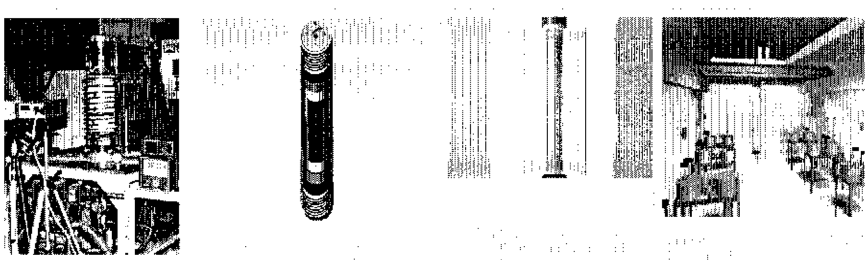
Proposed AVS Privatization Plan



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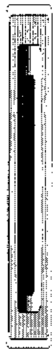

Thank You

RIC LLC

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Morris Reich, VP and Chief Engineer
Louis Ventre, VP and General Counsel
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EXECUTIVE SUMMARY

Breakthroughs achieved in the DOE-funded Advanced Vitrification System research and development project may cause a rethinking of U.S. policy for cleaning up high-level radioactive wastes at Hanford, Washington.

Photograph of Test 16
This obsidian-like, leach resistant, vitrified product was created from a mix of 80% (by measured weight), highly alkaline (pH=13.4) radioactive waste simulant and 20% borosilicate glass frit using the RIC AVS Concept. Test 16 is the culmination of the first 7 months of a 24 month research and development project sponsored by the U.S. Department of Energy to develop an operating prototype of the RIC AVS. This system holds the promise of vitrifying the high level radioactive waste stored in underground tanks at the U.S. Government's Hanford facilities for half the cost of systems currently planned.

BACKGROUND

Cleaning up waste produced as a by-product of 50 years of supplying the nation's nuclear materials for weapons is a formidable scientific and technical challenge. The enormity of the challenge is underscored by the requirement for The Department of Energy (DOE) to spend over $5 billion per year in a projected decades long program to clean up the radioactive and hazardous waste at the Nation's nuclear weapons production sites. The Hanford Site, located in southeast Washington State, has one of the greatest concentrations of radioactive waste in the World. The Hanford challenge involves 177 underground storage tanks holding millions of gallons of highly radioactive liquid waste, sludge, and other materials. Cleaning up this waste is urgent and important because it poses a significant and imminent risk to the environment and the surrounding communities.

Treating the first ten percent of the Hanford wastes is projected to cost $8.9 billion (including $2 billion in DOE's support costs). The entire treatment program is expected to take 30 years or more.

The purpose of the Advanced Vitrification System research and development project and the relevance to DOE's challenge is to demonstrate an alternative technology to the continuous melter design that is currently in place at, or planned for Hanford and possibly other DOE sites. The RIC AVS technology consists of vitrification-in-the-final-disposal container, and promises to have a high payback in lower costs, greater safety, increased reliability, and better environmental performance.

PROJECT DESCRIPTION

For each year beginning in FY 1997, the Congress of the United States has recommended, in the conference reports to the Energy and Water Development Appropriation Acts, that the Department of Energy conduct research on higher risk, high-payoff processing and vitrification technologies such as modular in-can vitrification. Partly in response to these directions, the DOE entered into a 24 month agreement on August 6, 1998 with the Radioactive Isolation Consortium, LLC (RIC) to develop its Advanced Vitrification System (RIC AVS).

The contract between the Government and RIC provides that RIC develop its RIC AVS technology to immobilize radioactive high-level waste (HLW) inside the final disposal canisters.

EXECUTIVE SUMMARY

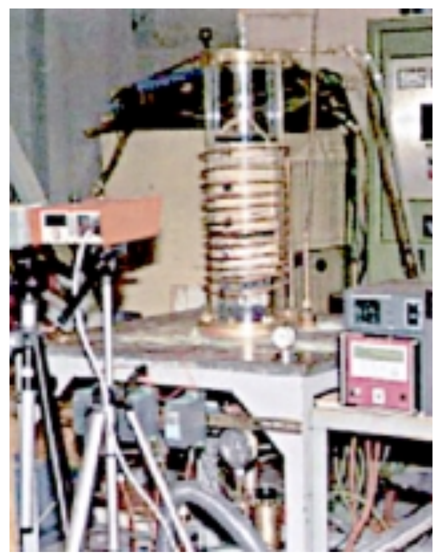
The project is divided into two phases. The first phase will produce a demonstration scale RIC AVS operating prototype in 24 months. The second phase, not funded by the current contract, will produce a full-scale operating RIC AVS prototype in 3.5 years.

The first phase, funded in this contract, is divided into two stages: an "Exploratory Development Stage," lasting 8 months and costing about $2 million; and an "Advanced Development Stage," lasting 16 months and costing about $8 million. The second stage will only be authorized upon successful completion of required tasks during the first stage, and the availability of funding. Success of the first stage will be determined in a "Gate Review" by the Department of Energy.

The two primary objectives are to provide evidence that the glassified non-radioactive waste simulant product in the proposed canister configuration will meet the Waste Acceptance Product Specifications for Vitrified HLW (WAPS); and that the preliminary life cycle cost analysis based on the exploratory development stage activities shows a favorable cost savings ratio over other available technologies.

The objective of the optional second stage is to construct a half scale RIC AVS operating prototype that:

- successfully vitrifies a range of glass-waste simulant formulations and
- provides additional data needed to refine a preliminary full scale RIC AVS design that is capable of meeting the performance requirements identified by DOE's Office of Environment Management Tanks Focus Area (TFA).


Bench-Scale Laboratory Apparatus for Testing the RIC AVS Concept to 1500°C (2732°F)

BREAKTHROUGHS

The Exploratory Development Stage of the RIC AVS research and development project has resulted in significant achievements that commend a change in course for DOE's high-level waste vitrification programs.

- **HIGH WASTE LOADINGS**

Waste loading of 80% in the glass has been achieved. This compares with a maximum safe loading percentage of about 27% using conventional melters. The RIC AVS higher waste loadings in the disposal canister will reduce the number of disposal canisters that would otherwise be created by the traditional melter technology by a factor of 2 or more. This reduction is projected to save billions of dollars in DOE defense disposal costs. DOE defense disposal costs are currently estimated to be 25% of the $49 billion Yucca Mountain project. If DOE will require

EXECUTIVE SUMMARY

less than 25% of the repository, commensurate savings will reduce DOE's contribution to the civilian waste repository.

Conceptual View of the RIC AVS Operating Facility Showing the Bridge Crane Transporting an RIC AVS Module to a Fill and Melt Station. Facility Operating Rate = 4 Modules per Day.

- **FASTER CLEANUP**

The RIC AVS facility enables a high-level waste vitrification campaign at Hanford to be completed in 12 years rather than in the 30 years currently anticipated under the privatization contract. Design of a relatively low capital cost facility is in progress. This facility will significantly reduce the need for costly construction and subsequent decontamination and decommissioning costs associated with the centralized melter concept.

- **SAVINGS**

RIC AVS product glass is projected to cost about one-half the cost of the product glass made with traditional melter technology. The RIC AVS cost in dollars per kilogram of high-level waste vitrified is $459. This compares to $1,200 for Hanford and $2,400 for the Defense Waste Processing Facility at Savannah River. The 10 million kilograms of high-level waste at Hanford results in savings of $7.4 billion.

The capability to accept caustic waste as a feed to the RIC AVS module will substantially reduce or eliminate pre-treatment neutralization steps, which are now required using conventional melters. Testing was conducted with feed having a pH= 13.4.

The RIC AVS technology has the capability to accept widely varying chemical compositions as input to the RIC AVS disposable vitrifier. The waste feed envelope for the RIC AVS technology is broader than the relatively stringent HLW flow sheet envelope required to preserve the operating capability of traditional melters.

The following table shows the parameters of the testing program involving the percentage waste loading, the analytically verified waste loading, and the pH of the sludge used.

RIC AVS Measured Waste Loadings and Simulant pH

Test	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
%W	35	35	35	35	100	35	70	35	45	70	70	67	42	72	78	78
% W tstd						37-40	65-70	37-39	43-47	71-73	50-51	57-61		65-71		74-83
pH											7-8	8.75	8.70	8.52	8.41	13.5

% W: estimated percentage of waste in the melt determined from the weights of dried sludges prior to melting.

% W tstd: measured percentage of waste in the melt determined from post vitrification chemical analyses of the vitrified mixtures.

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The chart on the next page graphically compares the results of leach testing performed by the Diagnostic Instrumentation and Analysis Laboratory at Mississippi State University. The two taller columns for each element shown are the leaching results in parts per million for two Environmental Assessment, or EA Glasses. The EA Glass is the reference glass. As can be seen, the RIC AVS glasses were far more leach resistant than the reference glasses in leachability results.

A diverse waste chemical variability will be permitted using the RIC AVS technology. This means that the RIC AVS technology minimizes the need for blending and pretreatment requirements, with consequent multi-billion dollar savings for DOE in the avoidance of costly and complicated blending and pretreatment operations. In addition, the RIC AVS has advantages in the avoidance of penalty payments to the vitrification contractor for any delays in delivering the waste stream, which is required to meet contractual commitments.

RELIABILITY

The RIC AVS will have greater operational reliability than traditional melters because the potential for a single point of failure that would cause a shutdown in operations is eliminated. Using the traditional melter technology, an entire vitrification campaign will be shut down should its single centralized melter fail. The envisioned RIC AVS Hanford facility processes twelve separate canisters acting as individual melters operating in parallel. A failure would only affect a single canister and would have minimal impact on the vitrification campaign.

ENVIRONMENTAL ENHANCEMENT

The RIC AVS technology will have less negative environmental impact than the traditional melter technology. Because the radioactive footprint of the RIC AVS facility is smaller, it poses less environmental burden from operations and decontamination and decommissioning. Additionally, the final melting process occurs in the final disposal container and completely avoids the well-known and historically problematic process of pouring HLW melted glass into disposal canisters. And finally, the inner graphite crucible of the RIC AVS forms a high integrity second container to provide environmental containment over geologic periods, a feature absent from current designs.

SAFETY

The RIC AVS technology will be safer than traditional melter technology because less radioactive contamination and less need for repair work in radioactively contaminated areas will impose a lower radiation burden on workers. Most of the vitrification accidents in the past 20 years have been associated with glass pouring and/or long-term deterioration of the melter. The RIC AVS is not subject to these problems, because no pouring of molten radioactive glass occurs.

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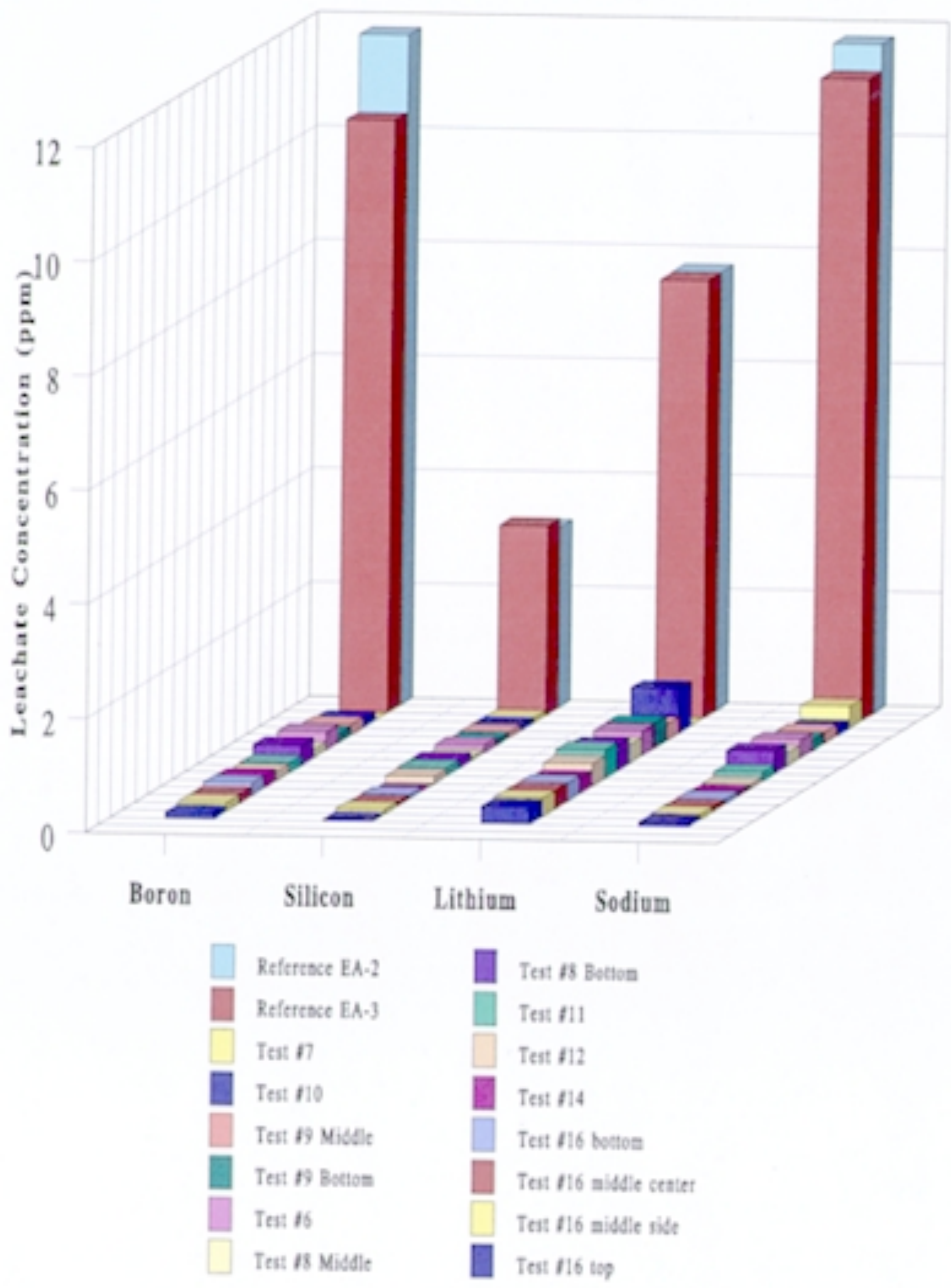
RIC AVS PRODUCT CHARACTERIZATION TEST (PCT) RESULTS

Leachability Comparison of AVS Test Samples to Reference EA Glass



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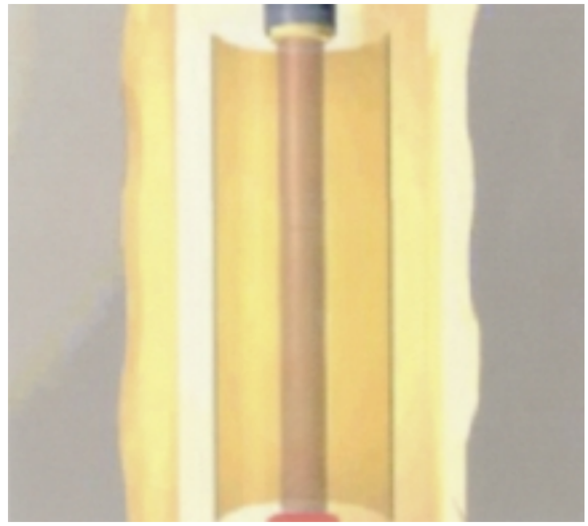
SYSTEM DESCRIPTION


RIC AVS Module Depicted in one of the RIC AVS Facility's Twelve Lower Level Fill and Melt Stations.

The Radioactive Isolation Consortium's (RIC) Advanced Vitrification System (RIC AVS) is a new high-level waste (HLW) vitrification technology in which HLW/frit mixtures are directly melted inside final disposal modules, which, after cooling and sealing, are sent to the geologic repository.

An RIC AVS module consists of a conventional stainless steel canister having an internal alumina lined graphite crucible. The crucible holds the HLW/frit mixture to be melted and is thermally insulated from the module's outer steel canister. When inductively heated by a low frequency (~30 Hertz), externally applied, AC magnetic field (~300 Gauss), the graphite/alumina crucible reaches a high temperature (i.e., ~1500C or greater), while the insulated outer steel canister remains at near ambient temperature. The RIC AVS uses induction heating with copper coils. No electrodes are used in the RIC AVS. The RIC AVS disposes of the crucible with the waste inside the canister. No scheduled repairs or replacement of crucibles is needed, and no subsequent crucible decontamination and decommissioning process is required.

The high temperature materials in the module are exposed to molten glass only once for about a day, instead of the many planned operating cycles for conventional melters. One-time use of the melter means that the RIC AVS module can process a diverse range of HLW compositions, substantially reducing pretreatment requirements. The RIC AVS technology may be the only technology available, which will accept a high-level waste with the diverse chemical constituents found at Hanford.

An operating facility will have 12 modules operating in parallel, such that a failure of a module will not stop system operation. Four canisters a day can be produced with each canister containing 2 to 3 times the amount of HLW as is placed in a conventional canister. This translates into a completion schedule for the entire Hanford high-level waste inventory in 12 years, instead of 30 years as currently planned.

The RIC AVS technology is more economical because the RIC AVS modules will vitrify a higher percentage of HLW — typically 80% — instead of the 25% for conventional melters. This feature reduces the number of disposal canisters by a factor of 2 to 3 and reduces canister disposal costs accordingly. The high-waste-content glass made in the RIC AVS has better leach resistance than low-waste content glass derived from current technology. Therefore, the RIC AVS technology offers greater environmental protection from the natural leaching process.

Ordinary stainless steel canisters holding the vitrified wastes are assumed to corrode and disappear after hundreds of years. The glass form is presumed to provide protection from release

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of the radioactive elements. However, the RIC AVS graphite crucible inside the stainless steel canister is an additional engineered barrier not found in the older technology. It is expected to survive for millions of years, further protecting the radioactive product glass from the natural leaching process.

The RIC AVS module will be filled with a proprietary process that permits the Module to contain as much melted glass as in a traditional canister. Since the RIC AVS glass will contain up to 80% waste in its glass, compared to 27% in a conventional canister, the RIC AVS process will permit the disposal of 2 to 3 times more waste in each canister as is possible using the conventional process.

After cooling, the RIC AVS Module is sealed, inspected (including for any unexpected external radioactive contamination and decontaminated if necessary), and stored on-site prior to ultimate disposal.